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REMARKS

Claims 1 – 15 and 17 - 21 are presently pending. In the above-identified Office Action, the Examiner rejected Claim 19 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 3, 5 – 9, 18 and 19 were rejected under 35 U.S.C. 102(b) as being anticipated by Schwanz *et al.* ('426) hereinafter 'Schwanz'. Claims 1 – 9, 18 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Schwanz in view of Devenyi ('549). Claims 10 and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Schwanz in view of Devenyi and further in view of Pan ('844). Claims 12 – 15, 17, 20 and 21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Schwanz in view of Devenyi.

For the reasons set forth more fully below, the subject application is deemed to properly present claims patentable over the prior art. Reconsideration, allowance and passage to issue are respectfully requested.

Ground 1. Claim 19 is rejected under 35 USC 112 as indefinite.

Claim 19 recites that "the spring pin is preloaded to ensure a positive contact between the spring pin and the leadscrew thread when a rotational direction of the leadscrew is reversed."

The explanation of the rejection (Office Action, page 3, lines 4-7) states that "it is unclear to the examiner how the spring pin is 'preloaded'"

The preloading of the spring pin 54 in the preferred embodiment is discussed in detail at para. [0021]-[0022] of the Specification, with reference to Figures 2-3:

"[0021] The spring pin 54 has a first end 56, a central portion 58, and a second end 60. The first end 56 and the second end 60 are each affixed to the drive nut housing 26 so that the central portion 58 spans across the nut bore 50 in an arced shape. It is this arced central portion 58

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that is seen in Figure 3 and engages the adjacent turns of the thread wire 46....

“[0022] Because the spring pin 54 is bent and under a bending force so that it contacts the adjacent turns of the leadscrew thread 44, the spring pin 54 applies a preload to the adjacent turns of the leadscrew thread 44 of the leadscrew 22. This preload ensures a positive contact between the spring pin 54 and the leadscrew thread 44, and eliminates “play” in the mechanical engagement and backlash when the rotational direction of the leadscrew 22 is reversed.”

The spring pin 54 (which is anchored at its ends) is bent in an arc across the nut bore. The bending of the spring pin applies a preload to the leadscrew thread 44. The equal and opposite reaction of the leadscrew thread 44 on the spring pin 54 results in mutual preloading of both the spring pin 54 and the leadscrew thread 44.

This preloading has the advantage that there is a positive contact between the driving element (the leadscrew thread 44) and the driven element (the spring pin 54 and the drive nut housing 26. This preloading is created when the apparatus having the described and recited structure is assembled with the bent spring pin 54.

Ground 2. Claims 1, 3, 5, 6, 7, 8, 9, 18, and 19 are rejected under 35 USC 102 as anticipated by Schwanz US Patent 4,227,426.

Schwanz is the sole or primary reference for each of the four prior art rejections (Grounds 2-5). It is therefore important to understand why Schwanz does not deal with a leadscrew at all.

In a leadscrew as described at para. [0002] and elsewhere in the present Application, and understood in the art, a rotational motor drive turns a leadscrew shaft rotationally at its proximal or driven end. At the distal (remote or driving) end of the leadscrew shaft, the rotation of the leadscrew shaft is converted to linear motion.

Schwanz discloses a device that pushes or pulls a drive wire 1 (formed of a helical coil 3 wrapped around the flexible wire 2, see Schwanz col. 2, lines 8-11) longitudinally parallel to its longitudinal axis without rotating the drive wire 1. See the title of Schwanz (“Device for Longitudinal Displacement of a Flexible Drive Wire”), last sentence of Abstract of Schwanz, Background col. 1, lines 6-8, col. 2, lines 37-39, and claim 1 at col. 3, lines 8-9. In the apparatus of Schwanz, “...the arm 8...pushes or pulls

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the wire 1 through the hollow shaft 6, depending upon the direction of rotation of the motor 5." (col. 2, lines 29-32)

Schwanz even describes in detail the structure that ensures that the drive wire 1 cannot possibly rotate in the manner of a leadscrew:

"In order to assure that the wire 1 is actually displaced longitudinally, and not simply rotated as the hollow shaft 6 and spring clip 7 rotate, a tab (not shown) which is slidably received in the slit of the sheath 4 may be attached to the wire 1. As the wire is driven, the tab would slide back and forth in the slit and prevent the wire 1 from rotating. Alternatively, the end of the flexible wire may be attached non-rotatably to the component being driven back and forth..." (col. 2, lines 33-45, emphasis added).

This point is important, because of the different structure and result achieved by Schwanz as compared with the presently claimed invention. The presently claimed invention causes its leadscrew to rotate about its longitudinal rotational axis, while Schwanz causes its drive wire 1 (which the explanation of the rejection incorrectly seeks to analogize to a leadscrew) to be pushed or pulled longitudinally with no rotation. The drive wire 1 is not a leadscrew, and Schwanz does not deal with leadscrews at all.

The distinctions are further made apparent by the claim recitations.

The following principle of law applies to sec. 102 rejections. MPEP 2131 provides: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. The identical invention must be shown in as complete detail as is contained in the ... claim. The elements must be arranged as required by the claim..." [citations omitted] This is in accord with the decisions of the courts. Anticipation under section 102 requires 'the presence in a single prior art disclosure of all elements of a claimed invention arranged as in that claim.' Carella v. Starlight Archery, 231 USPQ 644, 646 (Fed. Cir., 1986), quoting Panduit Corporation v. Dennison Manufacturing Corp., 227 USPQ 337, 350 (Fed. Cir., 1985)

Thus, identifying a single element of the claim which is not disclosed in the reference is sufficient to overcome a Sec. 102 rejection.

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Claims 1, 3, 5, 6, 7, 8, 18

Claim 1 recites two main elements, neither of which is disclosed by Schwanz.

Claim 1 recites in part as a first main element:

“a leadscrew operable to rotate about a rotational axis to linearly drive a driven structure”

The explanation of the rejection (Office Action, page 3, line 19-page 4, line 3) asserts that this limitation is met by the drive wire 1 of Schwanz, which is formed of the combination of the flexible wire 2 and the helical coil 3.

As emphasized by Schwanz, the drive wire 1 of Schwanz does not rotate at all. The drive wire 1 is physically constrained against rotating by the structure described at col. 2, lines 33-45 of Schwanz, which is quoted in full above. The drive wire 1 of Schwanz does not meet this claim limitation.

Claim 1 further recites in part as a second main element:

“a hollow drive nut housing affixed to the driven structure...”

The explanation of the rejection (Office Action, page 4, lines 4-5) asserts that the hollow shaft 6 of Schwanz corresponds to the recited drive nut housing. The hollow shaft 6 of Schwanz is not “affixed to the driven structure”, which is not shown in Schwanz but would be somewhere past the slit tube 4. Schwanz notes at col. 2, lines 13-16 that a typical driven structure would be the window pane in the door of an automobile, or it might be the slit tube 4. But in any event, the hollow shaft 6 of Schwanz is not affixed to the driven structure.

The hollow shaft 6 of Schwanz is instead at the drive end of the drive wire 1. The motor 5 acts through the hollow shaft 6 to move the drive wire 1 parallel to its long direction, without rotation, as discussed above.

Schwanz does not disclose either of the recited main elements of claim 1.

Claim 9

Claim 9 incorporates the limitations of claim 1 and is patentable for the reasons discussed above.

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Claim 9 additionally recites in part:

“a motor that rotationally drives the leadscrew”

The explanation of the rejection analogizes the drive wire 1 of Schwanz to the recited leadscrew. The motor 5 of Schwanz does not rotationally drive the drive wire. 1. Instead, the motor 5 of Schwanz moves the drive wire 1 longitudinally, not rotationally.

Claim 19

Claim 19 incorporates the limitations of claim 1 and is patentable for the reasons discussed above.

Claim 19 additionally recites in part:

“the spring pin is preloaded to ensure a positive contact between the spring pin and the leadscrew thread when a rotational direction of the leadscrew is reversed.”

Schwanz has no disclosure of this limitation. There is no mention of preloading at any location of Schwanz.

Ground 3. Claims 1-9, 18, and 19 are rejected under 35 USC 103 as unpatentable over Schwanz '426 in view of Devenyi US Patent 5,636,549.

Schwanz is not properly applied as a reference under 35 USC 103

Schwanz teaches a technology that is so diametrically opposed to that of the present claims, and achieves such a completely different result, that a person of ordinary skill in the art would not look to Schwanz for teachings to reach the presently claimed invention.

The analysis follows.

A. Schwanz is nonanalogous art

The present claims recite a leadscrew that rotates about its longitudinal rotational axis.

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Schwanz discloses a device that pushes or pulls a drive wire 1 parallel to its longitudinal axis without rotating the wire. Applicant incorporates the discussion of this distinction from the Ground 2 rejection.

This point is important, because of the different result achieved by Schwanz as compared with the presently claimed invention. The presently claimed invention causes its leadscrew to rotate about its longitudinal rotational axis with no longitudinal motion, while Schwanz causes its drive wire 1 to be pushed or pulled longitudinally with no rotation.

Schwanz is therefore nonanalogous art. Stated alternatively, Schwanz is not within the scope and content of the prior art that may be used in forming a sec. 103 rejection. To be analogous art and properly used in forming a sec. 103 rejection, a reference must be concerned with the same problem as another reference and the claims which are being addressed. See, for example, Medtronic, Inc. v. Cardiac Pacemaker, Inc., 220 USPQ 97, 104 (Fed. Cir. 1983), stating: "Faced with a rate-limiting problem, one of ordinary skill in the art would look to the solutions of others faced with rate-limiting problems."

In the present case, the inventor was concerned with a problem in improving the performance of leadscrew assemblies. The title is to a "Leadscrew Assembly...". The Background discusses leadscrews generally and the problems associated with some leadscrews. The first sentence in the Summary of the Invention of the present application begins: "The present invention provides a leadscrew assembly..." Every pending claim recites a "leadscrew assembly". In a leadscrew assembly, the leadscrew is rotationally driven, as presently recited in all of the claims. Consistent with the common usage in the art and as stated in para. [0010] of the present application, "The assembly typically further includes a motor that rotationally drives the leadscrew...". See also the present claims 1, 9, 12, 15, 19, and 20 (and thence through the parent claims, all of the dependent claims), all of which expressly recite rotation of the leadscrew.

Although the explanation of the rejection in the Final Office Action asserts that "Schwanz...discloses a screw assembly comprising...a cylindrical elongated shaft having a rotational axis...", that is not the case. Schwanz does not disclose or teach a leadscrew assembly, wherein the leadscrew is rotationally driven or has a rotational axis. In fact, Schwanz takes great care to emphasize that its drive wire 1 is not rotated and describes the structure that prevents rotation. Schwanz is therefore not properly applied in rejecting the present claims.

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Teachings from Schwanz are not pertinent to the field of a leadscrew as recited the present claims and disclosed in the present Specification. A person of ordinary skill looking to make improvements in the field of leadscrew mechanisms would not look to the wire push/pull mechanism taught by Schwanz.

B. Schwanz teaches away from the presently claimed approach

There is another important reason that Schwanz is not properly applied as a reference to reject the present claims. Schwanz teaches away from the present approach. Schwanz teaches that the drive wire 1 is moved parallel to its longitudinal axis, and that it is not rotated about its longitudinal axis(col. 2, lines 37-45). In the leadscrew assembly 20 of the present approach, just the opposite happens. The leadscrew 22 is rotated about its longitudinal axis but it is not moved parallel to its longitudinal axis. Schwanz thus teaches directly away from both the mechanism and the results obtained by the present approach.

It is a well-established principle of law that a prima facie case of obviousness may not properly be based on a reference which teaches away from the present invention as recited in the claims.

“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. In re Spinnoble, 160 USPQ 237 244 (CCPA 1969)...As “a useful general rule,”...“a reference that ‘teaches away’ can not create a prima facie case of obviousness.” In re Gurley, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994)”

The reason for this holding is self-evident. If the reference teaches away from the recited approach, there is no basis for reversing that teaching to produce a facsimile of the claimed invention, other than a pure hindsight reconstruction.

This legal principle also makes good sense. If a reference is committed to a particular approach that is directly contrary to the claim recitation, to ignore or attempt to make a fundamental change in that approach is necessarily an attempt at hindsight reconstruction.

In short, for the reasons stated above, Schwanz is not properly applied as a reference.

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The combination of Schwanz and Devenyi
does not teach the presently claimed invention

Even if Schwanz is improperly applied in an attempt to reject the present claims, no prima facie case of obviousness is made.

MPEP 2142, under ESTABLISHING A PRIMA FACIE CASE OF OBVIOUSNESS, provides: "To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. [citations omitted]. See MPEP para 2143-2143.03 for decisions pertinent to each of these criteria."

First requirement--there must be an objective basis for combining the teachings of the references

The first of the requirements of MPEP 2142 is that "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings". The present rejection is a sec. 103 combination rejection. To reach a proper teaching of an article or process through a combination of references, there must be stated an objective motivation to combine the teachings of the references, not a hindsight rationalization in light of the disclosure of the specification being examined. MPEP 2142, 2143 and 2143.01. See also, for example, In re Fine, 5 USPQ2d 1596, 1598 (at headnote 1) (Fed.Cir. 1988), In re Laskowski, 10 USPQ2d 1397, 1398 (Fed.Cir. 1989), W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 311-313 (Fed. Cir., 1983), and Ex parte Levengood, 28 USPQ2d 1300 (Board of Appeals and Interferences, 1993); Ex parte Chicago Rawhide Manufacturing Co., 223 USPQ 351 (Board of Appeals 1984). As stated in In re Fine at 5 USPQ2d 1598:

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"The PTO has the burden under section 103 to establish a prima facie case of obviousness. [citation omitted] It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references."

And, at 5 USPQ2d 1600:

"One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

Following this authority, the MPEP states that the examiner must provide such an objective basis for combining the teachings of the applied prior art. In constructing such rejections, MPEP 2143.01 provides specific instructions as to what must be shown in order to extract specific teachings from the individual references:

"Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention when there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992)."

* * * * *

"The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)."

* * * * *

"A statement that modifications of the prior art to meet the claimed invention would have been 'well within the ordinary skill of the art at the time the claimed invention was made' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the

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teachings of the references. Ex parte Levengood, 28 USPQ2d 1300 (Bd.Pat.App.& Inter. 1993)."

Here, there is set forth no objective basis for combining the teachings of the references in the manner used by this rejection, and selecting the helpful portions from each reference while ignoring the unhelpful portions. An objective basis is one set forth in the art or which can be established by a declaration, not one that can be developed in light of the present disclosure.

In this case, Schwanz deals with a structure in which the drive wire 1 is not rotated but is moved longitudinally parallel to its axis, while Devenyi deals with a structure in which a leadscrew rotates but does not move longitudinally parallel to its axis. The structures of these two references accomplish exactly the opposite result. There is certainly no motivation to combine their teachings, and there is no concept of how the teachings could possibly be combined, even in hindsight.

Second requirement--there must be
an expectation of success

The second of the requirements of MPEP 2142 is an expectation of success. There is no expectation of success because of the reasons discussed above. This requirement has not been addressed in the explanation of the rejection, and in any event more than Examiner's argument is required here.

As stated in MPEP 2142, "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. [citations omitted]."

Third requirement--the prior art
must teach the claim limitations

The third of the requirements of MPEP 2142 is that "the prior art reference (or references when combined) must teach or suggest all the claim limitations." In this regard, the following principle of law applies to all sec. 103 rejections. MPEP 2143.03 provides "To establish prima facie obviousness of a claimed invention, all claim

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limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the applied prior art references clearly do not arguably teach some limitations of the claims.

Claims 1, 3, 4

Claim 1 recites two main elements, neither of which is taught by the combination of Schwanz and Devenyi.

Claim 1 recites in part as a first main element:

"a leadscrew operable to rotate about a rotational axis to linearly drive a driven structure"

The explanation of the rejection (Office Action, middle of page 9) asserts that this limitation is met by the drive wire 1 of Schwanz, which is formed of the combination of the flexible wire 2 and the helical coil 3.

The drive wire 1 of Schwanz does not rotate at all. In fact it is physically constrained against rotating by the structure described at col. 2, lines 33-45 of Schwanz, which is quoted in full above. The drive wire 1 of Schwanz does not meet this claim limitation.

Claim 1 further recites in part as a second main element:

"a hollow drive nut housing affixed to the driven structure and comprising

a nut bore having an unthreaded inner surface with the leadscrew being inserted through the nut bore, the nut bore being sized such that the leadscrew may rotate therein about the rotational axis, and

a spring pin affixed to the drive nut housing and spanning across the nut bore to engage the leadscrew thread."

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The explanation of the rejection (Office Action, bridging pages 6-7) asserts that the hollow shaft 6 of Schwanz corresponds to the recited drive nut housing. The hollow shaft 6 of Schwanz is not "affixed to the driven structure", which is not shown in Schwanz but would be somewhere past the slit tube 4. Schwanz notes at col. 2, lines 13-16 that a typical driven structure would be the window pane in the door of an automobile, or it might be the slit tube 4. But in any event, the hollow shaft 6 of Schwanz is not affixed to the driven structure.

The hollow shaft 6 of Schwanz is instead at the driven end of the drive wire 1. The motor 5 acts through the hollow shaft 6 to move the drive wire 1 parallel to its long direction, without rotation, as discussed above.

Devenyi illustrates an entirely different concept of a driven structure, see Figure 2 of Devenyi. This has no spring pin or anything of the sort. If Devenyi's teaching is to be adopted as to other features, then the driven structure of Figure 2 must be adopted as well.

Schwanz and Devenyi do not disclose either of the recited main elements of claim 1.

Claim 2

Claim 2 incorporates the limitations of claim 1 and is patentable for the reasons discussed above.

Claim 2 additionally recites in part:

"a spacer wire having a size smaller than that of the thread wire and helically interwrapped about the elongated shaft with the thread wire."

The explanation of the rejection seeks to draw this teaching from the structure taught in Figure 2 of Devenyi. However, if that course is taken, then the rest of the embodiment of Figure 2 of Devenyi must be adopted as well. A conventionally internally threaded nut element 8 is taught for use in conjunction with the leadscrew embodiment of Figure 2 of Devenyi. There is no reason to change to any other form of the nut element 8, and specifically there is no reason to believe that the leadscrew approach of the embodiment of Figure 2 of Devenyi is operable with the linear drive of Schwanz. No basis is set forth in Schwanz or Devenyi for making such a combination.

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Claim 5

Claim 5 incorporates the limitations of claim 1 and is patentable for the reasons discussed above.

Claim 5 additionally recites in part:

“the spring pin has a first end and a second end, and wherein the first end and the second end are each affixed to the drive nut housing”

The recited “spring pin” is part of a drive nut housing of a leadscrew assembly, see parent claim 1. Schwanz does not deal with leadscrew assemblies, so any teaching about leadscrew assemblies must be drawn from Devenyi. Devenyi teaches two types of drive nut housings, as seen in the embodiments of Figures 2 and 4. Neither of these embodiments includes a teaching of a spring pin. Thus, the combination of references does not teach a spring pin used in a drive nut housing of a leadscrew assembly.

Claim 6

Claim 6 incorporates the limitations of claim 1 and is patentable for the reasons discussed above.

Claim 6 additionally recites in part:

“wherein the spring pin has a first end, a central portion, and a second end, and

wherein the drive nut housing comprises a first spring pin retainer and an oppositely disposed second spring pin retainer, the first spring pin retainer having the first end of the spring pin affixed thereto and the second spring pin retainer having the second end of the spring pin affixed thereto, with the central portion of the spring pin spanning in an arc across an interior of the nut bore to engage the leadscrew thread.”

The recited “spring pin” is part of a drive nut housing of a leadscrew assembly, see parent claim 1. Schwanz does not deal with leadscrew assemblies, so any teaching about leadscrew assemblies must be drawn from Devenyi. Devenyi teaches two types of drive nut housings, as seen in the embodiments of Figures 2 and 4. Neither of these

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embodiments includes a teaching of a spring pin. Thus, the combination of references does not teach a spring pin used in a drive nut housing of a leadscrew assembly.

Similarly, the other structure recited in claim 6 is not taught by Devenyi, the only applied reference that deals with lead screws.

Claim 7

Claim 7 incorporates the limitations of claim 1 and is patentable for the reasons discussed above.

Claim 7 additionally recites in part:

“the first spring pin retainer and the second spring pin retainer each comprise openings in the drive nut housing.”

The recited “spring pin retainer” is part of a drive nut housing of a leadscrew assembly, see parent claim 1. Schwanz does not deal with leadscrew assemblies, so any teaching about leadscrew assemblies must be drawn from Devenyi. Devenyi teaches two types of drive nut housings, as seen in the embodiments of Figures 2 and 4. Neither of these embodiments includes a teaching of a spring pin retainer. Thus, the combination of references does not teach a spring pin retainer used in a drive nut housing of a leadscrew assembly.

Claim 8

Claim 8 incorporates the limitations of claim 1 and is patentable for the reasons discussed above.

Claim 8 additionally recites in part:

“the drive nut housing has an access opening therethrough, through which the spring pin is accessible from an exterior of the drive nut housing and providing clearance for the spring pin”

The recited “drive nut housing” is part of a leadscrew assembly, see parent claim 1. Schwanz does not deal with leadscrew assemblies, so any teaching about leadscrew assemblies and their drive nut housings must be drawn from Devenyi. Devenyi teaches

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two types of drive nut housings, as seen in the embodiments of Figures 2 and 4. Neither of these embodiments includes a teaching of an access opening or a spring pin. Thus, the combination of references does not teach a drive nut housing with an access opening or a spring pin in a leadscrew assembly.

Claim 9

Claim 9 incorporates the limitations of claim 1 and is patentable for the reasons discussed above.

Claim 9 additionally recites in part:

“a motor that rotationally drives the leadscrew.”

Neither reference teaches a motor that rotationally drives a leadscrew. Even more specifically, neither references teaches a motor that rotationally drives a leadscrew having the limitations recited in parent claim 1.

Claim 18

Claim 18 incorporates the limitations of claim 1 and is patentable for the reasons discussed above.

Claim 18 additionally recites in part:

“the spring pin contacts the leadscrew thread over a portion of a single turn.”

The recited “spring pin” is part of a drive nut housing of a leadscrew assembly, see parent claim 1. Schwanz does not deal with leadscrew assemblies, so any teaching about leadscrew assemblies must be drawn from Devenyi. Devenyi teaches two types of drive nut housings, as seen in the embodiments of Figures 2 and 4. Neither of these embodiments includes a teaching of a spring pin. Thus, the combination of references does not teach a spring pin used in a drive nut housing of a leadscrew assembly.

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Claim 19

Claim 19 incorporates the limitations of claim 1 and is patentable for the reasons discussed above.

Claim 19 additionally recites in part:

“the spring pin is preloaded to ensure a positive contact between the spring pin and the leadscrew thread when a rotational direction of the leadscrew is reversed.”

The recited “spring pin” is part of a drive nut housing of a leadscrew assembly, see parent claim 1. Schwanz does not deal with leadscrew assemblies, so any teaching about leadscrew assemblies must be drawn from Devenyi. Devenyi teaches two types of drive nut housings, as seen in the embodiments of Figures 2 and 4. Neither of these embodiments includes a teaching of a spring pin. Thus, the combination of references does not teach a spring pin used in a drive nut housing of a leadscrew assembly.

Further, neither reference teaches this limitation. Neither reference mentions preloading in any way.

Ground 4. Claims 10-11 are rejected under 35 USC 103 as unpatentable over Schwanz ‘426 in view of Devenyi ‘549, and further in view of Pan US Patent 6,459,844.

Schwanz is not properly applied in rejecting these claims, for the reasons discussed in relation to the Ground 3 rejection, which reasons are incorporated here.

Applicant incorporates the discussion of the requirements of a sec. 103 rejection from the response to the Ground 3 rejection. Applicant will discuss these requirements in relation to the present Ground 4 rejection.

First requirement--there must be an objective basis for combining the teachings of the references

Schwanz deals with a structure in which the drive wire 1 is not rotated but is moved longitudinally parallel to its axis, while Devenyi and Pan deal with structures in which a leadscrew rotates but does not move longitudinally parallel to its axis. The

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structures of Schwanz, on the one hand, and Devenyi and Pan, on the other, accomplish exactly the opposite result. There is certainly no motivation to combine their teachings, and there is no concept of how the teachings could possibly be combined, even in hindsight.

Second requirement--there must be
an expectation of success

There is no expectation of success because of the reasons discussed above. This requirement has not been addressed in the explanation of the rejection, and in any event more than Examiner's argument is required here.

As discussed in Pan at col. 4, lines 52-54, the slide in Pan is attached to a lead screw 2, not a push-pull wire as in Schwanz.

Third requirement--the prior art
must teach the claim limitations

Claim 10

Claim 10 incorporates the limitations of claim 1 and is patentable for the reasons discussed above in relation to the Ground 3 rejection.

Further, in the proposed combination of teachings, the drive wire 1 does not rotate for the reasons discussed by Schwanz at col. 2, lines 37-45. Claim 10 recites in part: "so that the drive nut housing does not rotate". In the proposed combination, then, the drive wire 1 does not rotate and the hollow shaft 6 does not rotate. The complete absence of any relative motion means that the apparatus cannot function.

Claim 11

Claim 11 incorporates the limitations of claim 10 and claim 1 and is patentable for the reasons discussed above in relation to the Ground 3 rejection.

Claim 11 additionally recites in part:

"an optical filter supported on the linear slide mechanism, the
optical filter being movable by a rotation of the leadscrew."

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As discussed earlier, Schwanz teaches that its drive wire 1 does not rotate. Therefore any combination of teachings of Schwanz with another reference, such as Pan, cannot teach the limitation "the optical filter being movable by a rotation of the leadscrew".

Ground 5. Claims 12-15, 17, 20, and 21 are rejected under 35 USC 103 as unpatentable over Schwanz '426 in view of Devenyi '549.

This combination of references is the same as set forth in the Ground 3 rejection. Applicant incorporates by reference from the discussion of the Ground 3 rejection the reasons that Schwanz is not properly applied as a reference, the reasons that there is no objective basis for combining the teachings of Schwanz and Devenyi, and the reasons that there is no expectation of success for combining the teachings of Schwanz and Devenyi.

Even if the references are combined, they do not teach the limitations of the claims.

Part of the problem with the explanation of the rejection at pages 10-13 of the Office Action is that the claim limitations are not correctly set forth in the explanation of the rejection. This may have resulted in the incorrect analysis according to the explanation of the rejection.

Claim 12

Claim 12 recites three main elements, none of which is taught by the combination of Schwanz and Devenyi.

Claim 12 recites in part as a first main element:

"a leadscrew"

The explanation of the rejection (Office Action, middle of page 10) asserts that this limitation is met by the drive wire 1 of Schwanz, which is formed of the combination of the flexible wire 2 and the helical coil 3.

The drive wire 1 of Schwanz does not rotate at all and is not a leadscrew. In fact it is physically constrained against rotating by the structure described at col. 2, lines 33-

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45 of Schwanz, which is quoted in full above. The drive wire 1 of Schwanz does not meet this claim limitation.

Claim 12 further recites in part as a second main element:

“a hollow drive nut housing comprising

a nut bore having an unthreaded inner surface with the leadscrew being inserted through the nut bore, the nut bore being sized such that the leadscrew may rotate therein about the rotational axis, and

a spring pin affixed to the drive nut housing and spanning across the nut bore to engage the leadscrew thread,

wherein the spring pin has a first end, a central portion, and a second end, and

wherein the drive nut housing has a first spring pin retainer therein and an oppositely disposed second spring pin retainer therein, the first spring pin retainer receiving the first end of the spring pin therein and the second spring pin retainer receiving the second end of the spring pin therein, with the central portion of the spring pin spanning in an arc across an interior of the nut bore to engage the leadscrew thread over a portion of a single turn;”

The explanation of the rejection (Office Action, bridging pages 10-11) asserts that the hollow shaft 6 of Schwanz corresponds to the recited drive nut housing. The hollow shaft 6 of Schwanz is not “affixed to the driven structure”, which is not shown in Schwanz but would be somewhere past the slit tube 4. Schwanz notes at col. 2, lines 13-16 that a typical driven structure would be the window pane in the door of an automobile, or it might be the slit tube 4. But in any event, the hollow shaft 6 of Schwanz is not affixed to the driven structure.

The hollow shaft 6 of Schwanz is instead at the drive end of the drive wire 1. The motor 5 acts through the hollow shaft 6 to move the drive wire 1 parallel to its long direction, without rotation, as discussed above.

Devenyi illustrates an entirely different concept of a driven structure, see Figure 2 of Devenyi. This has no spring pin or anything of the sort. If Devenyi’s teaching is to be adopted as to other features, then the driven structure of Figure 2 must be adopted as well.

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Claim 12 further recites in part:

“a linear slide mechanism to which the drive nut housing is affixed so that the drive nut housing does not rotate.”

Neither reference teaches a linear slide mechanism.

Schwanz and Devenyi do not disclose any of the recited three main elements of claim 12.

Claim 13

Claim 13 incorporates the limitations of claim 12 and is patentable for the reasons discussed above.

Claim 13 additionally recites in part:

“the first spring pin retainer and the second spring pin retainer each comprise openings in the drive nut housing”

The recited “spring pin retainer” is part of a drive nut housing of a leadscrew assembly, see parent claim 12. Schwanz does not deal with leadscrew assemblies, so any teaching about leadscrew assemblies must be drawn from Devenyi. Devenyi teaches two types of drive nut housings, as seen in the embodiments of Figures 2 and 4. Neither of these embodiments includes a teaching of a spring pin retainer. Thus, the combination of references does not teach a spring pin retainer used in a drive nut housing of a leadscrew assembly.

Claim 14

Claim 14 incorporates the limitations of claim 12 and is patentable for the reasons discussed above.

Claim 14 additionally recites in part:

“the drive nut housing has an access opening therethrough, through which the spring pin is accessible from an exterior of the drive nut housing and providing clearance for the spring pin”

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The recited "drive nut housing" is part of a leadscrew assembly, see parent claim 12. Schwanz does not deal with leadscrew assemblies, so any teaching about leadscrew assemblies and their drive nut housings must be drawn from Devenyi. Devenyi teaches two types of drive nut housings, as seen in the embodiments of Figures 2 and 4. Neither of these embodiments includes a teaching of an access opening or a spring pin. Thus, the combination of references does not teach a drive nut housing with an access opening or a spring pin in a leadscrew assembly.

Claim 15

Claim 15 incorporates the limitations of claim 12 and is patentable for the reasons discussed above.

Claim 15 additionally recites in part:

"a motor that rotationally drives the leadscrew about the rotational axis."

Neither reference teaches a motor that rotationally drives a leadscrew. The explanation of the rejection analogizes the drive wire 1 of Schwanz to the recited leadscrew. The motor 5 of Schwanz does not rotationally drive the drive wire. 1. Instead, the motor 5 of Schwanz moves the drive wire 1 longitudinally, not rotationally. Even more specifically, neither references teaches a motor that rotationally drives a leadscrew having the limitations recited in parent claim 12.

Claim 17

Claim 17 incorporates the limitations of claim 12 and is patentable for the reasons discussed above.

Claim 17 additionally recites in part:

"an optical filter supported on the linear slide mechanism, the optical filter being movable by a rotation of the leadscrew."

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Neither reference teaches or mentions in any way "an optical filter". It is therefore not possible that the references teach "the optical filter being movable by a rotation of the leadscrew".

Claim 20

Claim 20 recites three main elements, none of which is taught by the combination of Schwanz and Devenyi.

Claim 20 recites in part as a first main element:

"a leadscrew"

The explanation of the rejection (Office Action, middle of page 10) asserts that this limitation is met by the drive wire 1 of Schwanz, which is formed of the combination of the flexible wire 2 and the helical coil 3.

The drive wire 1 of Schwanz does not rotate at all, and is not a leadscrew. In fact it is physically constrained against rotating by the structure described at col. 2, lines 33-45 of Schwanz and quoted in full above. The drive wire 1 of Schwanz does not meet this claim limitation.

Claim 20 further recites in part as a second main element:

"a hollow drive nut housing comprising

a nut bore having an unthreaded inner surface with the leadscrew being inserted through the nut bore, the nut bore being sized such that the leadscrew may rotate therein about the rotational axis, and

a spring pin affixed to the drive nut housing and spanning across the nut bore to engage the leadscrew thread over a portion of a single turn of the leadscrew thread".

The explanation of the rejection (Office Action, bridging pages 10-11) asserts that the hollow shaft 6 of Schwanz corresponds to the recited drive nut housing. The hollow shaft 6 of Schwanz is not "affixed to the driven structure", which is not shown in Schwanz but would be somewhere past the slit tube 4. Schwanz notes at col. 2, lines 13-16 that a typical driven structure would be the window pane in the door of an

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automobile, or it might be the slit tube 4. But in any event, the hollow shaft 6 of Schwanz is not affixed to the driven structure.

The hollow shaft 6 of Schwanz is instead at the drive end of the drive wire 1. The motor 5 acts through the hollow shaft 6 to move the drive wire 1 parallel to its long direction, without rotation, as discussed above.

Devenyi illustrates an entirely different concept of a driven structure, see Figure 2 of Devenyi. This has no spring pin or anything of the sort. If Devenyi's teaching is to be adopted as to other features, then the driven structure of Figure 2 must be adopted as well.

Claim 20 further recites in part:

"a linear slide mechanism to which the drive nut housing is affixed so that the drive nut housing does not rotate."

Neither reference teaches a linear slide mechanism.

Schwanz and Devenyi do not disclose any of the recited three main elements of claim 20.

Claim 21

Claim 21 incorporates the limitations of claim 20 and is patentable for the reasons discussed above.

Claim 21 additionally recites in part:

"an optical filter supported on the linear slide mechanism, the optical filter being movable by a rotation of the leadscrew"

Neither reference teaches an "optical filter".

Further, as discussed earlier, Schwanz teaches that its drive wire 1 does not rotate. Therefore any combination of teachings involving Schwanz cannot teach the limitation "the optical filter being movable by a rotation of the leadscrew".

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Accordingly, Applicant respectfully submits that the Claims should be allowable.
Reconsideration, allowance and passage to issue are therefore respectfully requested.

Respectfully submitted,
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